CASES OF COUNTER-FEEDING IN FAS

Wietze Baron
Summer Institute of Linguistics

Many phonological rules relate to one another in characteristic fashion. A particular group of phonological rule relationships has been characterized in terms of the concepts of FEEDING and BLEEDING.

In a stage-setting article, Kiparsky (1968b), suggested that diachronic change could be partly explained in terms of these relationships.

A FEEDING relationship obtains when a rule (A) increases the number of forms to which another rule (B) is applicable.

In Fas (1), for example, we have the following two rules:

1. Voiceless high vowels (only occurring word-finally) delete between consonants. (HVD)
   
   cf. kət 'we sleep' kətmo 'we will sleep'
   kət[ə] 'we eat' kətmo 'we will eat'

2. Between incompatible consonants, shwa is inserted. (SHI)
   
t and m are incompatible, so that the phonetic forms turn out to be [kətəmo]²

Given the underlying form /kətə mo/, SHI is not applicable. HVD is, however, and once it has applied a form is derived to which SHI is now applicable. HVD is said to FEED SHI.

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1 Fas is spoken in the West Sepik Province. There are about 1600 speakers. I am indebted to Kias Sawoi, Sugu Aya, and Yetin Usfani and the villagers of Kilifas for teaching me their language and providing all the relevant information.

2 Only fricative or nasal plus homorganic stop appear to be compatible in Fas, that is, only these are not broken up by schwa. Forms containing compatible consonant clusters show that [j] cannot change directly to .

   c.f. [nəsį] 'I put (in my hair)'
   a nəsį ta [anəsta] 'I am putting (in my hair)'

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A BLEEDING relationship obtains when a rule (A) diminishes the number of forms to which another rule (B) is applicable.

English plural formation may do for an example. Given /z/ as the underlying suffix, two relevant rules are involved.

1. /z/ becomes /s/ following a voiceless consonant. (DV)
2. [t] is inserted between two (near) identical consonants followed by a word boundary. (I-INS)

How do they apply?

<table>
<thead>
<tr>
<th></th>
<th>kænt+z</th>
<th>kæt+z</th>
<th>kîs+z</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-INS</td>
<td>-</td>
<td>-</td>
<td>kîs+tz</td>
</tr>
<tr>
<td>DV</td>
<td>-</td>
<td>kæts</td>
<td>-</td>
</tr>
</tbody>
</table>

As it is, DV would have applied to kîs+z rendering kîss after which I-INS would have produced *kîs*s. Prior application of I-INS, however, changes the form such that DV is no longer applicable. I-INS is said to BLEED DV.

A COUNTER-BLEEDING relationship obtains if rule A would have bled rule B had it been ordered to precede rule B. As it is ordered following rule B and cannot therefore bleed it, it is said to COUNTER-BLEED rule A. If the plural of kîs had been *kîs*s we would have had a counter-bleeding relationship.

A COUNTER-FEEDING relationship obtains if rule A would have fed rule B had it been ordered to precede rule B. As it is ordered following rule B and cannot therefore feed it, it is said to COUNTER-FEED rule B.

Kiparsky (1968b) further claimed that both the FEEDING and the COUNTER-BLEEDING orders are the unmarked, that is the most natural order relationships. Notice that with both FEEDING AND COUNTER-BLEEDING both rules apply. The conclusion is then: RULES TEND TO SHIFT INTO THE ORDER WHICH ALLOWS THEIR FULLEST UTILIZATION IN THE GRAMMAR. The qualification TEND TO is crucial, as it suggests that languages may have a marked rule order, but should then be expected, in diachronic change, to move towards the unmarked order. The best known illustration of this process is from two American dialects and
involves the pairs: 'write/writer' and 'ride/ rider'.

Two rules are involved:

1. Flapping. Both t and d go to the Flap [D] following a
   stressed syllable and preceding a vowel. (FL)

2. Vowels lengthen preceding voiced consonants. (VL)

In dialect A we have the rules apply in the order FL, VL.

<table>
<thead>
<tr>
<th></th>
<th>rayt</th>
<th>rayt + ør</th>
<th>rayd</th>
<th>rayd + ør</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL</td>
<td>-</td>
<td>rayØer</td>
<td>-</td>
<td>rayØer</td>
</tr>
<tr>
<td>VL</td>
<td>-</td>
<td>rayØer</td>
<td>rayd</td>
<td>rayØer</td>
</tr>
</tbody>
</table>

All illustrated by the surface form of writer FL has FED VL. In
dialect B, however, the rules apply VL, FL.

<table>
<thead>
<tr>
<th></th>
<th>rayt</th>
<th>rayt + ør</th>
<th>rayd</th>
<th>rayd + ør</th>
</tr>
</thead>
<tbody>
<tr>
<td>VL</td>
<td>-</td>
<td>-</td>
<td>rayd</td>
<td>rayd + ør</td>
</tr>
<tr>
<td>FL</td>
<td>-</td>
<td>rayØer</td>
<td>-</td>
<td>rayØer</td>
</tr>
</tbody>
</table>

Notice that FL is not allowed (by the imposition of order) to FEED VL.
FL in fact COUNTER-FEEDS VL.

Given that it can be established that dialect B represents a conser-
ervative stage, the prediction has come true, in this particular
instance.

In this article we will be merely concerned with the FEEDING and
COUNTER-FEEDING relationships. Mainly because of difficulties with
the BLEEDING and COUNTER-BLEEDING part of the proposal, Kiparsky
extensively reformulated his principle, now known as the Opacity
Principle. (Kiparsky 1971):

A rule A —— B / C D is opaque to the extent that there are
surface representations of the form:

1. A in environment C D

or 2. B in environments other than C D

The first part of the Opacity principle is largely equivalent to
the principle which considers Counter-Feeding orders marked.
In their search for greater naturalness and/or constraints on the power of grammars, subsequent authors have taken Kiparsky's relative principle and given it an ABSOLUTE interpretation. In other words: COUNTER-FEEDING relationships do not occur in natural languages. Notice that such an approach implies the denial that language may simply reverse the order of two (or more) rules in diachronic change.

Natural Generative Phonology (forthwith NGP) achieves this prohibition of COUNTER-FEEDING--apart from a simple statement to the effect (Hooper 76 p.62)---by its True Generalization Condition (Hooper 76 p.16). This condition is formulated by Kenstowicz and Kisseberth as an absolute version of the Opacity Condition (1979:221):

1. If a rule of the form A → B / C_D is to be valid, then strings of the form CAD cannot occur in the Phonetic Representation. 3

2. If B is to be derived from A by the rule A → B / C_D, then B must appear in the string CBD in the Phonetic Representation.

Koutsoudas, Sanders and Noll (henceforth KSN) (1974) effect the prohibition by their basic principle, formulated in Koutsoudas 1978 (p.4) as:

"An obligatory rule must apply wherever its structural description is met".

Koutsoudas furthermore notes that the principle can be falsified by showing that in a given language:

"A pair of empirically well-motivated rules must apply in a counter-feeding order." (1978 p.8)

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3 Actually K&K say 'cannot systematically occur' as they want to allow for the possibility of a few isolated lexical exceptions. Whether Hooper really intends such proviso is not clear.
The generalized rule reads:

Rule: as /e/ appears to be consistently contrasted in other morphemes, so do the possessive suffix and derive the hyphenation by pronunciation.

As [+th] segments appear to be the cause of the change we postulate

* a, bit, run 
* hantle (of axe, etc.,) fo to 
* stem, kco 
* the, kyon 
* man (name of man,) mewn 
* hand, keyn 
* bit, sly [sly] sl si 
* execute, feo f 
* child, fea 
* count, tano 
* a, tree, mako mek

Non-possessive suffix

Consider the following data:

may not even be all that uncommon either. The examples should show that Counter-Peeding not only may occur, but has occurred. As neither fast speech nor optional is more pronounced than have been observed, we would like to present two cases of Counter-Peeding occurring in the obligatory in dialect A, whereas the facts in the Counter-Peeding section KSN could say that the Peading rule is optional in dialect B and applies in fast speech in dialect B, whereas it is normal in dialect A.

To allow for [opposite] NCP could say that the Peading rule only applies in fast speech in dialect B, whereas it is normal in dialect A.

Examples in mind (cf. discussion in Konstoa (ed) 1976 p.285ff.)

Examplifies in mind (cf. discussion in Konstoa (ed) 1976 p.285ff.)

(Probably with some justification) that this is not a matter of

Counter-Peeding rule (cf. Konstoa 1976 p.122) claims

Hooper (76 p.112) similarly allows for

in fact, stipulate that obligatory rules proceed optional ones.

Notice that the process "obligatory" leaves them a way out. KSN,
High Vowel Formation (HVF)

\[
\begin{align*}
\begin{array}{c}
\text{[-cons]} \\
\text{[+syl]} \\
\text{[-low]}
\end{array}
\end{align*}
\xrightarrow{\text{[+ high]}}
\begin{align*}
\begin{array}{c}
\text{[-cons]} \\
\text{[+high]}
\end{array}
\end{align*}
\]

Now consider the following forms:

<table>
<thead>
<tr>
<th>Fe</th>
<th>feyo</th>
<th>'a variety of wild sugar cane'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Me</td>
<td>meyo</td>
<td>'mother'</td>
</tr>
<tr>
<td>Si</td>
<td>siyu</td>
<td>'bird'</td>
</tr>
</tbody>
</table>

It appears, in fact, that a rule is needed inserting y between e/i and any following vowel.

Y-Insertion (Y-INS)

\[
\begin{align*}
\begin{array}{c}
\varnothing \quad \text{y} \\
\end{array}
\end{align*}
\xrightarrow{\text{[-cons]}}
\begin{align*}
\begin{array}{c}
\varnothing \quad \text{y} \\
\end{array}
\end{align*}
\]

Notice now that the rules HVF and Y-INS stand in a COUNTER-FEEDING relationship. Y-INS would have FED HVF had it been ordered before it.

cf. fe+o

Y-INS feyo HVF

HVF *feyu Y-INS feyo

One may wonder whether *feyu is indeed what one should expect. Y-Insertion seems to be a late phonetic process and for such a late phonetic process to cause neutralization between following non-low vowels does not seem entirely natural.

Consider another process illustrated by the following data:

<table>
<thead>
<tr>
<th>Verb/Noun</th>
<th>+ thematic vowel</th>
<th>or possessive affix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pan</td>
<td>pano 'go'</td>
<td></td>
</tr>
<tr>
<td>Gı́</td>
<td>gı́ o 'build'</td>
<td></td>
</tr>
<tr>
<td>Su</td>
<td>suu 'burn'</td>
<td></td>
</tr>
<tr>
<td>Ni</td>
<td>niyu 'they shoot'</td>
<td></td>
</tr>
</tbody>
</table>


Given these examples, the next step is to explore the feeding potential of the rule, e → y / V_V (GLIDE FORMATION - GLF).

Once again we see that a rule with feeding potential has to be ordered after the rule it could have fed. In other words, GLF COUNTER-FEEDS HVF.

Koutsoudas, actually, also proposed a principle which, presumably, takes precedence over the one prohibiting COUNTER-FEEDING: (1978 p. 24).
The Morphophonemic-Allophonic Principle (MAP)

"A morphophonemic rule application must always take precedence over an allophonic rule application.

Given a rule $A \rightarrow B/C_D$ applicable to a form CAD, the application of this rule is MORPHOPHONEMIC if there are strings of the form CBD which could be derived from a source other than CAD; otherwise the application of the rule is ALLOPHONIC".

The principle is interesting in that it reintroduces into Generative Phonology the distinction Morphophonemic/Allophonic without positing a phonemic level. This is achieved by focussing on the nature of a rule in regards to a particular form. Thus it is possible for one reading of the rule to be morphophonemic and another to be allophonic. For example, the voicing rule in Dutch changes /p/ and /t/ to the phonemes /b/ and /d/ before voiced consonants. It changes [k] to [g] but as [g] is only an allophone of /k/, the latter rule application is allophonic and the former morphophonemic.

Returning to the Fas data, it appears that both Y-INS and GLF are hybrid rules. y in e.g. [feyo] 'a variety of wild sugar cane' can only be derived by insertion as any underlying y would have caused the following o to go to u. In its application to e.g. /ana ne+a/ 'I am speaking' it is morphophonemic, as the resulting [neya] could also have been derived from e.g. /ne +ya/ '(I) spoke + emph.'

GLF is allophonic in deriving [sɔyo] from /sɔe + o/ 'exchange + thematic vowel' but morphophonemic in deriving [(ana) sɔya ] from /ana sɔe + a/ 'I am exchanging', as [sɔya] could be derived from /sɔ + ya/ 'flower+emph.'

HVF is purely morphophonemic in that the high vowels have an alternative source e.g. /key + in/ 'I went down and planted' [keyin].

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4 The term Morphophonemics in Phonology has a history of variant and confusing interpretations. NGP in the Hooper version also postulates that Morphophonemic rules precede Phonological rules. In Hooper (76) it refers to those rules which apart from their phonological content also crucially contain non-phonetic information. (e.g. [+Verb] or [Class 3])
As the forms involving allophonic application of the Y-INS and BLF rules are precisely the ones in which these rules are counterfeited by HVF, it appears that the situation is correctly predicted by the MAP principle.

We will adduce one more case of COUNTER-FEEDING in Fas. Rounding of front vowels is an across the board phenomenon in Fas and it appears to affect vowels both preceding and following w.

cf. oy 'I cut' ney 'I shoot' nay 'I go outside'
    ow 'he cuts' now 'he shoots' now 'he goes outside'

sisyen 'I send him' from /sisj+en
sisuwan 'I send you' from /sisj+wan/

pen 'I go' et 'I build' tati 'I shoot'(pl.obj.)
penɛ 'go!' etɛ 'build' tateɛ 'shoot!'

tepoxy 'I cut' saf่อย 'I hold'
tepwo 'cut!' sefw่อย 'hold!'

We lack evidence of we → wo, but as [we] does not occur apart from being amongst the class of examples about to be discussed, we will generalize the rule as follows:

Rounding (Rnd)

\[
\begin{array}{c}
\text{-cons} \\
\text{-syl} \\
\text{-back} \\
\text{-round} \\
\end{array}
\longrightarrow
\begin{array}{c}
\text{[+ rnd]} \\
\text{/w} \\
\end{array}
\]

Now a number of examples occur showing both [we], [w ], and [wi].

e.g. wlimo 'I will cut' cf. oy 'I cut'
    lwemo 'I will open' fo 'I open'
    swemo 'I will exchange' səe 'I exchange'

Fas has no voiced stop phonemes. Stops occurring before voiced non-syllabics exhibit a voiced allophone, which is not indicated in this paper.
Posing a COUNTER-FEEDING rule relationship, all the counter
eamples to Backing can be interpreted as having underlying oy/oe/ e.
Also non-complex forms could then be thus interpreted:

- mwëna /m ena/ 'ear'
- wema /oema/ 'first-born (child)
- wima /oyma/ 'a banana'

The rule is formalized as follows: (W-Formation - WF)

\[
\begin{array}{c}
-\text{cons} \\
-\text{syl} \\
+\text{back} \\
\text{low} \\
\end{array}
\rightarrow
\begin{array}{c}
-\text{cons} \\
+\text{syl} \\
-\text{back} \\
\text{round} \\
\end{array}
\rightarrow
\begin{array}{c}
-\text{syl} \\
\text{low} \\
\text{CV} \\
\end{array}
\]

As [w + back vowel] can also be naturally derived from underlying
/w + back vowel/ c.f. /nɔw + o/ [nɔwu], this rule has a morphophonemic
application. [w + front vowel] only results from rule WF which rule
therefore has an allophonic interpretation.

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We have interpreted MAP in this paper according to what seems to
be its spirit, by considering rules allophonic in their applica-
tion if the input form remains recoverable. Under this inter-
pretation the flapping rule in dialect B is allophonic in that
the underlying form of rayDér can only be rayter. As the vowel
length rule is clearly allophonic, MAP does not apply. Under
the more literal interpretation of MAP, flapping would be mor-
phophonemic in that a flap between a stressed syllable and a
vowel (without taking more precise information about the context
into account) could be derived from either d or t. This inter-
pretation would provide a counter-example to MAP. It would also
render the Fas rules (Y-Ins) and (GLD) morphophonemic throughout,
and consequently render MAP inapplicable in these instances. The
exact implications of either interpretation are still under
investigation.
It appears then that MAP correctly accounts for the COUNTER-FEEDING cases in Fas. Notice that this solution does not apply in the writer/reader case.

Notice also that in case of a hybrid rule it is implied that given another relevant rule, the hybrid rule feeds the given rule in its morphophonemic application and counter-feeds it in its allophonic application. It is in this respect that the principle may well meet with serious counter-evidence.

We conclude then that COUNTER-FEEDING situations do exist in natural languages, that these tend to be restricted to situations where the counter-feeding rule has (for the relevant forms) allophonic application. We are not yet ready to concede that MAP is an absolute constraint on natural languages.
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